Breakout Group 3:
Notional CHRIS Architecture

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Definitions

- **Definition of terms are an issue!**
  - **Human Behavior**
  - **Human Behavior Representation (HBR)**
    - **stimulus / response**
    - **situation and the actions that can be taken**
    - **only things that can be observed**
  - **Human Behavior Models (HBM)**
    - **transformation function**
    - **alternative transformation functions are likely**

CHRIS Scope Issues

- Are we describing HBR or HBM or both?
  - (HBR minimal)
  - No single approach to HBM or HBR is satisfying--want them all at different times
- One or more representations?
  - converters & manipulators
- Interaction among Behaviors, ID levels of specification to address
  - agent to agent
  - agent to world
  - agent to subcomponents
  - subcomponents to subcomponents
- Ease of use secondary
- What about tools?
  - Part of architecture?

CHRIS PROBLEM STATEMENT

- **Plug-and-Play; Interfaces for:**
  - **agent to subcomponents/behavior modules**
  - **agent to outside world**
  - **groups of agents**
  - **other people's behavior**
  - **e.g., FSM implementations**

- **Transmission of Knowledge**
  - **agent architecture/components/… (HBR representation)**
  - **from one representation framework to another (e.g., FSM)**
  - **Implementation-independent transmission/storage of human behavior models (agents, groups, sub-agent modules)**

Notional Architecture--What is it?

Core (relatively stable) components of a CHRIS:

Grammar:
Formal Language for specifying behavior

Plug & Play APIs

Storage of Representations

Reference Model
- Meta-Data
- Dictionary (but not content)

Mechanism for Retrieval

Minimal

Desired

Content

Taxonomy
- Std interface for behavior "modules"
- Std interface for human/agent/group interaction with environment
- granularity, competing levels

Provable

Tool Set

The question is:

Is CHRIS Feasible?

“YES” ⟵ or ⟶ “No

“And Here’s Why…”

CHRIS Desirability/Feasibility

	Original Model developers & Researchers	Model Simulators & Integrators	Trainers and Analysts
Plug & Play at agent level	Desirable? & Feasible	Very Desirable & Feasible	Very Desirable
Plug & Play at subcomponent level	Desirable & Feasible but tough	Not Applicable	Very Desirable
HBR Transmission	Desirable & Feasible	Very Desirable & Feasible	Not Applicable
HBM Tranmission	Desirable & Feasible? but very tough	Very Desirable & Feasible? but very tough	Not Applicable

Relationship to HLA

- HLA
  - Federate Object Model
  - Only pass what you need gets passed
  - Lower bandwidth relative to DIS
  - Publish and subscribe on selected services
- HLA for runtime transmission of data
  - HBR makes sense
  - HBM may not be possible (probably offline?)
- HLA compliance should be an expected requirement
- HLA compliance won’t guarantee interoperability of HBMs
  - CHRIS should ensure interoperability

Seek DoD investment and achieve a reasonable return-on-investment?

- If the government doesn't do the investment, it won't get done.
  - M&S is important
  - Training
  - DoD operational community must participate

- Other Communities:
  - Game community
    - interfaces for robots
    - still primitive compared to DoD(not heterogeneous)
    - Simulation games provide publish/exchange mechanisms
  - Movie community
    - Farther out

Backup

Technical Feasibility

- **HBR & Plug-and-Play**
  - **minimal capability**
- **HBM transmittal**
  - **harder: includes decision process/inference**
  - **harder: isomorphism not provable**
- **API**
  - **implementation neutral**

Technical Feasibility

- XML
  - Meta-Data
  - RDF
- Runtime Services?
  - Active participant?
- Content

Technical Feasibility

- **Weak & Flexible vs. Constraining**
- **Interaction vs. Representation**
  - **If one can handle Plug-and-play for both, may not need both**
- **Reference Model**
  - **Difficult to define w/o constraining**
  - **Minimal RM will be needed for storage & retrieval**
  - **One or more reference models? (flexibility)**
  - **Implementation neutral**

Technical Feasibility

CHRIS PROBLEM STATEMENT

Plug-and-Play

Interfaces for:

- agent to subcomponents
- agent to outside world
- groups of agents
- other people's behavior
- behavior "modules"
- FSM implementations

Representation of data & Interface for interaction

Transmission of Knowledge

- agent architecture/components/… (HBR representation)
- from one representation framework to another (e.g., FSM)
- Implementation-independent transmission/storage of human behavior models (agents, groups, sub-agent modules)

Representation

- Capability for Representation (HBx)
- No single approach to HBM or HBR is satisfying--want them all at different times

Scope

- Are we describing HBR or HBM or both? (HBR minimal)
- One or more representations?
- Ease of use secondary
- ID levels of specification to address (e.g., agent I/f to environment; I/f between components of different

Interaction among Behaviors

- Interactions of / with Behavior Representations (outside world or internal)
- converters & manipulators

Tool Set

Tools are required

- Editors
- Testing
- Visualization